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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/695,356

10/27/2003

Shih-Ping Hsu

LA-7452-105.US

6002

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7590

04/12/2005

FULBRIGHT AND JAWORSKI L L P  
PATENT DOCKETING 29TH FLOOR  
865 SOUTH FIGUEROA STREET  
LOS ANGELES, CA 900172576

EXAMINER

BEREZNY, NEMA O

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 04/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/695,356	HSU ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Nema O. Berezny	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

This Office Action is in response to Applicant's paper filed 1-18-05, which has been entered and considered. Claims 1-20 are pending, with claims 1-6 withdrawn.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 7-8, 10-12, 14-16, and 18-20 are rejected under 35 U.S.C. 102(a) as being anticipated by Makino et al. (6,566,239). Makino discloses a fabrication method for a semiconductor package substrate having a contact pad protective layer formed thereon, the method comprising the steps of: providing an insulating layer (Figs.1-12 el.13) having a plurality of blind vias formed therein for exposing inner traces (el.12) disposed underneath the insulating layer (col.1 lines 50-54); forming a conductive film (el.14) on the insulating layer and over the blind vias; forming a first resist layer (el.15) on the conductive film, wherein the first resist layer has a plurality of openings (el.16) to expose predetermined parts of the conductive film; performing a first electroplating process to form a patterned trace layer (el.17) in the openings and in the blind vias to form conductive vias, wherein the patterned trace layer comprises a plurality of contact pads, and at least one of the contact pads is electrically connected to at least one of the conductive vias (Figs.3,5; col.1 line 64 – col.2 line 5); forming a second resist layer (el.18) over the patterned trace layer exclusive of the contact pads, making the contact pads exposed from the second resist layer (Fig.5); performing a second electroplating process to form a metal barrier layer (el.21,22) on the contact pads (Fig.8; col.2 lines 20-24, 44-45); and removing the second resist layer (Figs.8-9), the first resist layer (Figs.3-4), and parts of the conductive film covered by the first resist layer (Figs.9-10) [claims 7, 14]. Makino also discloses a solder mask (el.26) for covering the patterned trace layer and having a plurality of openings to expose the metal barrier layer (Fig.11) [claims 8, 15]; wherein the substrate is a flip-chip package substrate or a wire-bonded package substrate (Fig.12; Fig.24; col.2 lines 37-39; col.8

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lines 38-43) [claims 10, 18]; wherein the contact pad is selected from the group consisting of a bump solder pad, solder ball pad, and wire-bonded pad (Fig.12) [claims 11, 19]; wherein the metal barrier layer is made of a material selected from the group consisting of gold (Au), nickel (Ni), palladium (Pd), silver (Ag), tin (Sn), Ni/Pd, chromium (Cr)/titanium (Ti), NiAu, Pd/Au, and Ni/Pd/Au (col.2 lines 20-24) [claims 12, 20]; and wherein the openings of the resist layer correspond in position to the blind vias of the insulating layer (Fig.3) [claim 16].

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makino as applied to claims 7 and 14 above, and further in view of Shinomiya (5,907,786). Makino does not disclose a multi-layered structure. However, Makino would look to one such as Shinomiya for a protective surface because Shinomiya discloses wherein a substrate (Figs.1(b)-1(h) el.11) has a multi-layered structure having a plurality of non-conductive layers (el.12,13), and the insulating layer (el.13) is one of the non-conductive layers formed closest to an outside-exposed surface of the substrate. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the multi-layered structure of Shinomiya with the method of Makino in order to provide a surface protecting film for the device (col.4 lines 9-10).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Makino as applied to claim 7 above, and further in view of Wang et al. (2004/0000427). Makino does not specifically disclose a dry or liquid photoresist film. However, Makino would look to one such as Wang for application versatility because Wang discloses wherein the first or second resist layer is a dry photoresist film or a liquid

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photoresist (p.5 para.39). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the photoresist of Wang with the method of Makino; wherein a dry or liquid photoresist can be applied by several different methods and used under a variety of conditions (p.5 para.39).

### ***Response to Arguments***

Applicant's arguments filed 1-18-05 have been fully considered but they are not persuasive. Applicant contends that Makino does not disclose "... to form a patterned trace layer in the opening and in the blind vias to form conductive vias, wherein the patterned trace layer comprises a plurality of contact pads, and at least one of the contact pads is electrically connected to at least one of the conductive vias." Examiner disagrees. As cited in the prior and instant rejections, Makino Fig.3 shows a trace layer (el.17) within a resist opening (el.16) and within the blind via formed in the insulating layer (el.13) over the inner trace (el.12). Fig.5 of Makino shows a contact pad (no #; opening in resist layer) which is connected to said conductive vias.

Applicant also contends that Makino forms a first resist layer which is removed right after formation of the wiring, which is unlike Applicant's invention. As claimed, there is no specific requirement for removing the first and second resists in a single step or in any particular order. Therefore, Makino discloses said claimed steps.

Applicant also contends that Examiner misapprehended the electrode pad (el.12) as the contact pad. This was never cited in the rejections, nor was it the intention to cite el.12 as the claimed contact pad. As cited in the prior and instant rejections, Fig.5 shows an area of trace layer (el.17) exposed by the second resist layer (el.18) that is to be contacted (hence, contact pad) by the copper post. A contact pad in its broadest reasonable interpretation is defined as an electrically conductive area which is to be adjoined with another electrically conductive area in order to conduct electrical current. The exposed area of trace layer (el.17) in Fig.5 clearly shows this.

Applicant also contends that Makino, alone or in combination with Shinomiya or Wang fails to teach or suggest certain elements, including: forming multiple layers of thin trace structures on the

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substrate; forming a metal barrier layer with a similar dimension as the contact pad; reducing the effective wiring area of the package; and reducing signal interference. However, none of these specific elements were claimed.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nema O. Berezny whose telephone number is (571) 272-1686. The examiner can normally be reached on M-F 9-5:30.

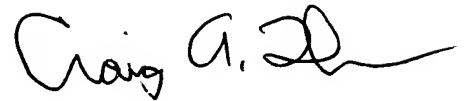
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through

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Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>.  
Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NB

A handwritten signature in black ink, appearing to read "Craig A. Thompson". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

**CRAIG A. THOMPSON  
PRIMARY EXAMINER**